

a whirling motion and the course of the storm was south. Windstorms at Cozad, Lexington, and Superior, Nebr.

5th.—Windstorm at Kipp, Mont. Hailstorm at Gallinas Spring, N. Mex.

6th.—Hail and thunder storm at Sante Fe, N. Mex.; began at 11.48 p. m., 6th, and continued until early morning, 7th.

7th.—Colorado Springs, Colo., rain and thunder storm in the afternoon.

8th.—A hailstorm at Lexington, Nebr.

9th.—A thunder and hail storm, with a funnel-shaped cloud, at Floydada, Tex. Thunderstorms in Kansas and Missouri. At Kansas City, Mo., a child killed by lightning. Takoma, Wash., windstorm; several persons injured.

10th.—Wakefield, Kans., stock killed by lightning.

11th.—Thunderstorms at Portland, Me., and Nantucket, Mass.

12th.—Greenfield Hill, Conn., hailstorm. Dunmore, Pa., a man and stock were killed and 2 persons injured by lightning. Baltimore, Md., thunderstorm with heavy rain in the afternoon; the temperature fell from 89° to 63° in about 10 minutes, and 0.30 inch of rain fell in 5 minutes. On Lake Huron, 5 miles out from Oscoda, Mich., man injured by lightning.

13th.—Southport and Wilmington, N. C., thunderstorms.

14th.—Glasgow, Mo., man killed by lightning.

15th.—Memphis and Nashville, Tenn., thunderstorms. Chicago, Ill., man killed by lightning. Ashboro, Ind., hailstorm. Granite Falls, Minn., horse killed by lightning. Des Moines, Iowa, and Concordia, Kans., thunderstorms. Gorin, Mo., hailstorm. Menominee, Mich., 3 men killed by lightning.

16th.—Albany, N. Y., and Harrisburg, Pa., thunderstorms. Conway, Ark., windstorm. Amarillo, Tex., thunder, wind, and hail storm. Springfield, Ill., thunderstorm. Near Athens, Ill., boy killed by lightning. Thornton, Mich., 4 persons injured by lightning.

17th.—Cornwall, Vt., North Hammond, N. Y., and Newbern, Ala., thunderstorms. Mason, Tenn., man killed by lightning. Louisville, Ky., windstorm. Harrison, Nebr., thunderstorm.

18th.—Lancaster, N. H., 2 persons injured by lightning. Malone, N. Y., 3 horses killed by lightning. Blacksburg, S. C., thunderstorm. Ellsworth, Kans., windstorm. Topeka, Kans., thunderstorm. Hutchinson, Kans., horse killed by lightning. Osage, Kans., man killed by lightning. Omaha, Nebr., thunderstorm.

19th.—Hartland, Vt., and Honeymead Brook, N. Y., thunderstorm. Paterson, N. J., wind and rain storm. Sioux City, Iowa, thunderstorm. Tornado passed about 12 miles northeast of Bowdle, S. Dak.; funnel-shaped cloud observed; 3 persons killed and 8 injured.

20th.—Portsmouth, Va., man killed by lightning. Conway, Ark., windstorm. Tuscola, Ill., boy killed by lightning. Brookville, Ind., windstorm. Worthington, Ind., and Clarion, Iowa, thunderstorms. Eagle Grove, Mason City, and Sioux City, Iowa, windstorms. Faribault, Minn., thunder and rain storm; one man killed. Narka, Kans., thunderstorm. Dorchester, Syracuse, and Lincoln, Nebr., windstorms. Omaha, Nebr., thunderstorm; one person drowned by the capsizing of a boat and a boy fatally injured by flying debris.

21st.—Parkersburg, W. Va., most severe thunder and rain storm on record; began 11.32 p. m., ended 12.15 a. m., 22d. Boonville, Mo., and Dodge City, Kans., thunderstorms. Hutchinson, Kans., boy killed by lightning.

22d.—Parkersburg, W. Va., thunderstorm. Charleston, W. Va., one person and a horse killed by lightning. Oxford, La., windstorm. Twelve miles northeast of Bayport, Mich., man killed by lightning. Port Huron, Mich., thunderstorm. Le Claire and Princeton, Iowa, hailstorms. Pine River, Minn., thunder and wind storm.

23d.—Antrim, N. H., and Fitchburg, Mass., thunderstorms. Near Friendship, N. Y., stock killed by lightning. Egypt, Miss., windstorm. About 1½ miles east of Tiffin, Ohio, wind and rain storm moved north; one person killed. Stevens Point, Wis., thunderstorm. Hays City, Kans., and 10 miles south of Huron, S. Dak., hailstorms. Irvington, Nebr., windstorm.

24th.—Squalls and rough sea in New York Harbor. North Hammond, N. Y., and Erie, Pa., thunderstorms. Phoenixville, Pa., wind and rain storm. Ashtabula, Ohio, rain and hail storm. Madison, Ind., windstorm. Detroit, Mich., rain and wind storm. Point Edward, Mich., man injured by lightning. Near Chillicothe, Mo., horses killed by lightning.

25th.—Charlotte, N. C., man killed by lightning. Tampa, Fla., Pekin, Ill., and Detroit, Mich., thunderstorms. Two miles east of Reedsburg, Wis., stock killed by lightning. East Lynne, Hardin, and Mexico, Mo., thunderstorms. Cedar Point, Kans., thunderstorm; funnel-shaped cloud observed. Concordia and Girard, Kans., rainstorms. Montgomery County, Kans., hailstorm. Keighley and Oswego, Kans., thunderstorms.

26th.—Erie, Pa., thunderstorm; 3 persons stunned by lightning. Four miles east of Erie man killed and 2 persons stunned by lightning. Parkersburg, W. Va., Louisville, Ky., and in Ohio, thunderstorms. Madison and Worthington, Ind., windstorms. Yates Center, Kans., thunderstorm. Toronto, Kans., windstorm. Northwestern part of Wyoming, man killed by lightning.

27th.—Bethlehem, N. H., and Watertown, N. Y., thunderstorms. Violent local storms, with characteristics of tornadoes, occurred at the following places in Minnesota and South Dakota: Cedar Mills, Cold Springs, Willmar, Collegeville, Echo, Sleepy Eye, Fergus Falls, Forest City, Holland, Litchfield, Minneapolis, Montrose, Raymond, St. Paul, Selma, and Pipe Stone, Minn.; Aberdeen, Alpena, Bath, Bonilla, Huron, Hitchcock, St. Lawrence, and Sisseton Agency, S. Dak. Ten persons were killed in Minnesota and 6 in South Dakota. Pittsburg, Kans., windstorm; funnel-shaped cloud observed.

28th.—Falkland, N. C., rainstorm. Augusta, Ga., thunderstorm. Springdale, Tenn., rainstorm. Logan, Ohio, windstorm. Montpelier and Toledo, Ohio, thunderstorms. New Holland, Ohio, rainstorm. Chillicothe, Mo., thunderstorm.

29th.—Bailey, N. C., Moseley Hall and Tampa, Fla., thunderstorms.

30th.—New Hartford, Conn., cattle killed by lightning. Dyberry, Pa., thunderstorm. Salisbury, N. C., and Blacksburg, S. C., windstorms. Lake City, Fla., thunderstorm. Ovid, Iowa, 6 miles from St. Charles, Mo., 2 horses killed by lightning.

ATMOSPHERIC ELECTRICITY.

GENERAL STATISTICS.

The table on page 251 shows in detail for June, 1894, the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month.

THUNDERSTORMS.

A mention of the more severe thunderstorms reported during the month is given under "Local storms." The dates on which reports of thunderstorms were most numerous were the 16th, 294; 17th, 257; 18th, 268; 21st, 227; 23d, 277; 24th, 295; 25th, 254; 26th, 289.

Thunderstorms and auroras, June, 1894.

States.	No. of stations.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	Total.		
Alabama	52	T.					1			1	1				2	2	4	3	4	3	1	1	2	3	6	3	2			1			40	T.	
Arizona	51	T.																											4	3	2		9	T.	
Arkansas	49	T.				6				1	4					1	2	2	4		2	5	7	2									36	T.	
Colorado	80	T.	3	10	6	3	5	3	2	5			1	2	8	21	5		1		4	6	9	3	7	2			1				107	T.	
California	175	T.																															0	T.	
Connecticut	22	T.		6		8					1		4						5	5	2	5		2			1	1	1		8	49	T.		
Delaware	5	T.			1		2						2							1	2	1			4			1	1			1	16	T.	
District of Columbia	4	T.				1							1	1				1	1					1			1	1				1	9	T.	
Florida	35	T.	5	7	8	5	3	10	5	7	1	3	1	1	10	4	5	5	7	3	8	5	4	7	6	10	10	10	12	11	10		183	T.	
Georgia	63	T.			1	1		1					2	7	5	2	3	9	8	5	5	6		1	4	8	12	3	5	3	3		94	T.	
Idaho	23	T.	2	5	2			3	1	1	1		2					1	4	4	2				2	1	1			2			34	T.	
Illinois	59	T.	2		3	4	2	2			1	1	2	1	1	5	14	20	13	5	2	6	11	10	21	13	22	15	1	2	2	9	190	T.	
Indiana	43	T.				3	1					1	3	3		2	7	4	1	1	7	6	3	2	8	3	7				2		66	T.	
Indian Territory	8	T.					3					1						2				1	1										1	8	T.
Iowa	78	T.		1		1				15	9	3		1	7	15	12	2		10	9	15	9	20	5	5	10	8	2	10	12		181	T.	
Kansas	84	T.			5	2	5		1	5	7	10	1			1	8	8	3	11	2	7	15	5	3	8	14	3	4	3			131	T.	
Kentucky	40	T.				1	9	3			1		2	5	1		5	7	6	2	3	1	3	4	6	5	9	4	1	2			80	T.	
Louisiana	53	T.	1			1		9	1		12	13	10	2	1	6	6	8	12	6	13	9	12	13	7	8	4	1		1			162	T.	
Maine	18	T.	1	1		2	1					7						8	4	7	5	3		6			6	6	1		1		59	T.	
Maryland	24	T.			3	6	6	2	1				9	2			3	5	5		2	1	4	3	6	3	7	3	1	2	6		80	T.	
Massachusetts	82	T.		5	4	11	1		9		1		20					8	4	4	4	17		20	1		2	2	1		13	127	T.		
Michigan	85	T.			3					1		2	4	3	6	8	9	13	3			4	5	9	17	7	9	1	21				125	T.	
Minnesota	74	T.			1					10	8	2	9	5	5	7	15	4		1	6	20	6	11	24	6	7	12	17	2	5	2	174	T.	
Mississippi	50	T.	1	1	2			1	4		1	2	1		2	7	8	11	8	11	9	7	7	10	10		1						104	T.	
Missouri	97	T.			4	7	22		1		16	10	3	1	3	16	26	23	15	13	2	6	22	19	18	28	34	15	6	7	2	13	334	T.	
Montana	28	T.	1		3	1	2	3	3	6						1	3	5	3	4	3	1	3		1			1					40	T.	
Nebraska	67	T.		2	1	6	2			6	6					5	1	3		10	1	9	7		14	8	5	2	2	2	3	5	101	T.	
Nevada	20	T.	1				1																											7	T.
New Hampshire	25	T.		2		1			1			2	2				3	4	15	12	1	6	1	7		1	1	7	9	2	1	5	83	T.	
New Jersey	59	T.	1	1	2	21	5	1	2	1			1	2	7		1	12	5	3	15	8	4	2		17	1	9	7		4	18	150	T.	
New Mexico	27	T.		1	3		2	1	2		1																						11	T.	
New York	75	T.		1	9	7	1	1		1	1		15			1	12	13	23	16	2	1	2	5	22	10	18	5	1	11	4		183	T.	
North Carolina	57	T.				1	3	11	1	1		2	2	14	1	1	4	9	7	15	14	16	2		2	5	11	14	6	13	8		163	T.	
North Dakota	36	T.		1						1	3	1		1	2						4	1		1		3	1	6					25	T.	
Ohio	140	T.	2	3	14	21	5		1	1	7	2	3	18	12	4	2	36	32	39		5	11	9	24	49	35	56	18	49	26	11	475	T.	
Oklahoma	17	T.					4				1	3				1	1	1					1	3									15	T.	
Oregon	60	T.	1	7	4	1									4	5	8	2	1						1		1	1					36	T.	
Pennsylvania	85	T.	1	2	6	22	1	1	7				25	10			21	14	21	12	4	1	6	18	29	17	20	10	1	4	12		265	T.	
Rhode Island	6	T.			1	1	2												1					1								3	8	T.	
South Carolina	46	T.						3	1								1	6	9	7	8	8	1	1	5	15	9	11	11	12	9		125	T.	
South Dakota	41	T.	1	1		1				1		7	3	1	1	2	3	2	3	2	3	2		2	1	5	1	3	4	4	1		45	T.	
Tennessee	42	T.					4	2				2	1	2	3	2	5	10	10	11	6	3	8	4	4	6	4	3	3	1	8	2	103	T.	
Texas	81	T.	1	2	1		7	3	1	1	2	4	4	3	6	10	5	9	5		1	1	1	1									68	T.	
Utah	36	T.						1	1											1	1	2	2	1				2					11	T.	
Vermont	15	T.		1	1	2		1								2	4	8	10	8	3	2		2				4	4		1	2	55	T.	
Virginia	41	T.			4		3	5					1	4	2			1	6	5	4	6	1	1		1	4	4	4		4	4	64	T.	
Washington	47	T.		23	13	2												1	3	4													47	T.	
West Virginia	7	T.				2	3	2						1	1	1	1	1	4	8	2	5	2	8	5	3	6	6	1	3	7	4	74	T.	
Wisconsin	64	T.			1					2	3	2	4	1	3	2	25	24	6			6	6	7	25	5	16	7	8	10	1		163	T.	
Wyoming	12	T.	1		1					1						1					1			1	1	3							21	T.	
Sums	2,488	T.	31	80	103	147	111	73	40	35	86	71	81	121	101	112	183	294	257	268	188	190	227	166	277	295	254	289	174	155	142	171	4722	T.	
		A.	7	6	16	4	1	2	1	3	37	10	4	2	2	2	1	0	1	0	2	1	2	2	9	2	4	1	2	5	11	142	A.		

The States from which the reports of thunderstorms were most numerous were: Ohio, 475; Pennsylvania, 265; Illinois, 190; New York and Florida, 183; Iowa, 181; and Minnesota, 174.

AURORAS.

The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four days preceding and following the date of full moon, viz, from the 13th to the 23d, inclusive. On the remaining twenty-one days of the month 142 reports were received, or an average of 6 per day. The dates on which the reported number especially exceeded this average were the 3d (16), 9th (37), 10th (10). The States from which auroras were reported by a large percentage of observers were: New Hampshire, 9; North Dakota, 23; South Dakota, 16; Wisconsin, 21.

DAMAGE BY LIGHTNING.

The following statistics of the damage done by lightning in May and June, as reported by the observers of this Bureau, are furnished by Mr. Alex. McAdie.

During May, 1894, 45 persons were killed by lightning; 34 persons were struck and severely injured; 12 barns were set on fire, with an estimated loss of \$35,000; 37 dwellings, 4 churches, and 1 schoolhouse were struck and damaged to greater or less extent; 58 horses and 22 cows were killed.

During June, 1894, 96 persons were killed and 102 severely injured; 69 barns were struck, with an estimated loss of \$49,000; 49 horses, 30 cows, and 15 sheep were killed; 80 dwellings were struck and more or less damaged; 22 churches, 1 railroad depot, 1 oil tank, 1 grain elevator, and 6 mills and factories were struck, the damage in the case of the eight last-named being not less than \$257,500.

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS.

The following table shows the danger point and the highest and lowest stages for the month of June, 1894:

Heights of rivers above low-water mark, June, 1894.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Red River.</i>	<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
Shreveport, La.	29.2	17.2	1	6.0	30	11.2
<i>Arkansas River.</i>						
Fort Smith, Ark.	22.0	9.8	18	2.2	2	7.6
Little Rock, Ark.	23.0	9.9	20	4.9	4, 16	5.0
<i>Missouri River.</i>						
Fort Buford, N. Dak.	25.0					
Bismarck, N. Dak.	75.0					
Pierre, S. Dak.	13.0					
Sioux City, Iowa.	18.7	15.7	17, 18	12.0	1	3.7
Omaha, Nebr.	18.0	14.9	19	10.9	1	4.0
Kansas City, Mo.	21.0	20.1	20, 21	13.6	2	6.5
<i>Mississippi River.</i>						
St. Paul, Minn.	14.0	7.1	1	2.8	29	4.3
La Crosse, Wis.	10.0	9.5	1	4.3	30	5.2
Dubuque, Iowa.	16.0	14.1	1	4.8	29, 30	9.3
Davenport, Iowa.	15.0	12.2	1	3.3	29	8.9
Keokuk, Iowa.	14.0	11.4	4	3.5	30	7.9
Hannibal, Mo.	17.0	12.2	5, 6	4.3	30	7.9
St. Louis, Mo.	30.0	18.3	29	16.7	19, 20	1.6
Cairo, Ill.	40.0	26.1	3	17.6	28	8.5
Memphis, Tenn.	33.0	18.4	5, 6	11.8	30	6.6
Vicksburg, Miss.	41.0	25.8	10	17.2	30	8.6
New Orleans, La.	13.0	11.0	1	6.1	30	4.9
<i>Ohio River.</i>						
Parkersburg, W. Va.	38.0	11.0	7	3.6	25, 28, 29	7.4
Cincinnati, Ohio.	45.0	20.6	1	7.5	25, 29, 30	13.1
Louisville, Ky.	24.0	9.2	1	4.6	27, 29	4.6
<i>Cumberland River.</i>						
Nashville, Tenn.	40.0	6.3	1	1.7	28, 29	4.6
<i>Tennessee River.</i>						
Chattanooga, Tenn.	33.0	4.3	30	2.0	17	2.3
Knoxville, Tenn.	29.0					
<i>Monongahela River.</i>						
Pittsburg, Pa.	22.0	8.4	5	2.8	15	5.6
<i>Savannah River.</i>						
Augusta, Ga.	32.6	14.7	29	4.9	15, 18	9.8
<i>Willamette River.</i>						
Portland, Oregon.	15.0	33.0	7	23.3	30	9.7
<i>Susquehanna River.</i>						
Harrisburg, Pa.	17.0					
<i>Alabama River.</i>						
Montgomery, Ala.	48.0	3.4	29	0.5	14	2.9
<i>James River.</i>						
Lynchburg, Va.	18.0	1.2	8, 9	0.2	{ 16, 19-21, } { 23, 25, 26 }	1.0
<i>Sacramento River.</i>						
Red Bluff, Cal.	22.0	5.7	5	2.0	28-30	3.7
Sacramento, Cal.	25.0	21.3	1	16.0	30	5.3
<i>Des Moines River.</i>						
Des Moines, Iowa.	19.0	3.0	1-3, 25-30	2.8	11-23	0.2

FLOODS.

The above table shows that in the rivers here recorded the waters had risen above the danger line at Portland, Oreg., in the preceding month and that the flood in the Willamette and Columbia rivers continued during the whole of June, rising to a maximum of 33.0 feet, on the 7th, at Portland, and having fallen to only 23.5 feet on the 30th.

The following additional notes of floods in rivers are summarized from special reports and newspapers:

Arkansas River.—Pueblo, Colo., 6th, the Arkansas River began to rise about daylight, causing Fountain Creek to overflow, damaging bridges and flooding railroad tracks. The floods of May 31st and June 6th are attributed to so-called "cloud-bursts" in the adjacent mountains, or foothills.

Willamette River.—The river attained a height of 31.8 feet at Portland, Oreg., on the 4th, and 32.2 feet on the 5th; at midnight of the 6th the river reached its maximum height of 33.0 feet; the inundated portion of the city extended eleven blocks back from the river, and covered the better half of the business portion of the city. The flood far exceeded anything known to history or tradition; the water rose 4.8 feet above the high water of 1890, and 4.7 feet above that of 1876. This flood in the Willamette was principally due to the backing up of its waters by the flood in the Columbia.

Columbia River.—On the 5th, at Umatilla, the Columbia was at its maximum gauge reading, 34.5 feet; this great rise is attributed to the melting of the snow during the warm days beginning May 29, when nearly every mountain stream throughout the valleys of the Columbia, Fraser, and Snake rivers was greatly swollen and added greatly to the high water already present in the main streams. The experiences of this remarkable flood have served to emphasize the need of a more complete system of river flood reports for the protection of Portland, Oreg.

Fraser River.—At Westminster, on the 7th, the Fraser River reached its highest point, but a special flood wave, due to the cloud-burst at Lytton on the 6th, was expected to arrive the next day and might possibly add a little to this maximum. This flood was like that of the Columbia, several feet higher than any previously recorded and, like it, is attributed to the rapid melting of the snow on the warm days that culminated on the 2d of June when, as before stated, the maximum temperatures for the month were experienced in this section. These unusual temperatures occurred in connection with southerly winds blowing from a region of high pressure over the central Rocky Mountain plateau toward a region of low pressure on the coast of British Columbia, and as little or no rain accompanied them, it is presumable that the high temperatures originated like those of the fehn winds and the chinook.

Rio Grande River.—The Rio Grande, draining the western portion of Colorado, flooded several small regions on the 1st in connection with local cloud-bursts in the mountains and parks of that State.

LOW WATER AND NAVIGATION.

Ohio River.—The very low stage of water in the Ohio River caused the general suspension of river navigation above Maysville during the latter part of the month.